General

Guideline Title

ACR Appropriateness Criteria® growth disturbances—risk of intrauterine growth restriction.

Bibliographic Source(s)

Zelop CM, Javitt MC, Glanc P, Dubinsky T, Harisinghani MG, Harris RD, Khati NJ, Mitchell DG, Pandharipande PV, Pannu HK, Podrasky AE, Shipp TD, Siegel CL, Simpson L, Wall DJ, Wong-You-Cheong JJ, Expert Panel on Women's Imaging. ACR Appropriateness CriteriaÂ® growth disturbances -- risk of intrauterine growth restriction. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 7 p. [24 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Zelop CM, Andreotti RF, Lee SI, DeJesus Allison SO, Bennett GL, Brown DL, Dubinsky T, Glanc P, Mitchell DG, Podrasky AE, Shipp TD, Siegel CL, Wong-You-Cheong JJ, Expert Panel on Women's Imaging. ACR Appropriateness Criteria® growth disturbances -- risk of intrauterine growth restriction. [online publication]. Reston (VA): American College of Radiology (ACR); 2010. 7 p.

Recommendations

Major Recommendations

ACR Appropriateness Criteria®

Clinical Condition: Growth Disturbances—Risk of Intrauterine Growth Restriction (IUGR)

Variant 1: Risk of IUGR initial evaluation.

Radiologic Procedure	Rating	Comments	RRL*
US pregnant uterus	9	Assessment of fetal measurement, growth, amniotic fluid, fetal anatomic survey, and activity patterns is appropriate.	O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate		Assessment of biophysical profile is of indeterminate appropriateness. Biophysical profile components: 1) fetal heart-rate reactivity; 2) fetal breathing movements; 3) fetal movement; 4) fetal tone; and 5)	*Relative Radiation Level

Radiologic Procedure	Rating	amniotic fluid volume. Comments	RRL*
US pregnant uterus with Doppler	4	Assessment of umbilical and uterine arteries of indeterminate appropriateness. Evaluation of cerebral to umbilical artery ratio, cerebral arteries, and venous Doppler velocimetry are not appropriate.	O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Small fetus, low or low normal fluid, follow-up studies.

Radiologic Procedure	Rating	Comments	RRL*
US pregnant uterus	9	Optimal follow-up interval is 2 to 4 weeks. As the pregnancy enters the third trimester and approaches the time of possible (urgent) delivery, shorter scanning intervals may be indicated.	O
US pregnant uterus biophysical profile	8	Assessment of biophysical profile is appropriate. Biophysical profile components: 1) fetal heart-rate reactivity; 2) fetal breathing movements; 3) fetal movement; 4) fetal tone; and 5) amniotic fluid volume.	O
US pregnant uterus with Doppler	8	Interrogation of uterine artery, umbilical artery, middle cerebral artery and venous Doppler velocimetry may provide important ancillary data to the BPP, but is not, in general, a stand-alone test.	O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 3: Normal sized fetus, low or absent fluid, follow-up studies.

Radiologic Procedure	Rating	Comments	RRL*
US pregnant uterus	9	Optimal follow-up interval is 2 weeks.	O
US pregnant uterus biophysical profile	9	Assessment of biophysical profile is appropriate. Biophysical profile components: 1) fetal heart-rate reactivity; 2) fetal breathing movements; 3) fetal movement; 4) fetal tone; and 5) amniotic fluid volume.	O
US pregnant uterus with Doppler	8	Doppler velocimetry may provide important ancillary data to the BPP, but is not, in general, a stand-alone test.	O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Summary of Literature Review

Intrauterine growth restriction (IUGR) is an important complication of pregnancy. It can be associated with significant risks of perinatal morbidity and mortality. One of the primary mechanisms of IUGR is uteroplacental insufficiency, which may occur in a variety of maternal or placental conditions. The major concern in IUGR is not the small size of the fetus per se, but the possibility of life-threatening fetal compromise. IGUR is usually characterized as a small-for-gestational-age (SGA) fetus whose estimated fetal weight (EFW) is below the 10th percentile for that gestational age according to a reference population. However, some SGA fetuses are constitutionally small and not jeopardized by unfavorable placental health. Some growth-restricted fetuses may measure at or above the 10%, yet still be compromised by suboptimal rate of growth.

When clinically suspected, IUGR can be confirmed as probably present by sonographic fetal measurements and weight estimation, but both false-negative and false-positive cases can be anticipated. Findings that should prompt an ultrasound (US) examination include maternal size smaller than dates (lag of the fundal height on physical examination of >3 cm) or otherwise anticipated from a prior US, poor maternal weight gain, maternal hypertension, or pre-eclampsia. Other maternal conditions such as lupus erythematosus or a history of previous birth of a growth-restricted infant may also warrant evaluation.

The greater the risk of IUGR based on the clinical findings, the greater is the positive predictive value of US, but the likelihood of IUGR also increases even when US predicts a normal weight, and the risk of IUGR persists when the clinical suspicion is high even when US does not detect a fetus with an EFW less than the 10th percentile. EFW and abdominal circumference are equivalently better than the ratio between femur length and abdominal circumference in predicting IUGR, and biometry performed within 2 weeks of delivery is more predictive than when performed at 26 to 34 weeks. One group of researchers found that among SGA fetuses with no anatomic abnormalities, only those that were asymmetric (abdomen small in proportion to head) were associated with increased pregnancy-induced maternal hypertension before 32 weeks and cesarean delivery for abnormal heart rate patterns compared with those of fetuses average for gestational age (AGA). Additionally, asymmetric SGA fetuses sustained more adverse neonatal composite outcomes compared to symmetric SGA or AGA fetuses.

Once a probability of IUGR has been established, and uteroplacental insufficiency is considered to be a likely mechanism based on US findings and clinical setting, there are a series of possible therapeutic interventions that can be used to improve fetal growth and try to prevent fetal compromise. Assessment of fetal well-being is essential to the management of such pregnancies. This testing is aimed at determining if there is life-threatening fetal compromise, and whether urgent premature delivery would offer a better chance of survival and avoidance of morbidity than would continued exposure to an increasingly hostile intrauterine environment.

Periodic fetal biometry, evaluation of amniotic fluid volume, use of the biophysical profile (BPP) or a selected subset of its component tests, Doppler US, fetal heart-rate monitoring, and fetal movement counting can all contribute to the determination of fetal compensation or compromise. It is beyond the scope of this guideline to compare these methods and rate the relative effectiveness of the many individual parameters testable alone or in various combinations. Instead, the guideline ranks the relative utility of these broad categories of fetal assessment once a risk of IUGR and potential fetal compromise has been established.

Biophysical Profile

The BPP has been and remains the mainstay of fetal well-being evaluation. It consists of four parameters variably sensitive to the acute exposure of the fetus to hypoxemia: fetal breathing movements, fetal limb and body movements, fetal tone, and amniotic fluid volume as an indicator of chronic hypoxemia. The nonstress test (NST), which is sometimes included with the BPP as a fifth component, can be used alone as a test of acute status, but it is often coupled with amniotic fluid measurement, a valuable reflection of fetal hypoxemic exposure over the previous week. Each of the four or five components of the BPP receives a score of 0 or 2, hence, a maximum score of eight (or 10). Scores of 8 to 10 on the BPP are strong indicators of a well-compensated fetus, but there are many false positives when the fetus fails one or two of the acute marker tests. Reduced amniotic fluid volume is an important predictor of intrapartum fetal distress, much of which is attributable to umbilical cord compression events, and the fluid volume should be periodically checked in pregnancies suspected to have IUGR. Testing strategies usually evaluate one or more of the fetal well-being parameters at least weekly, and often twice weekly, from the point of potential postnatal viability onward. Amniotic fluid is usually assessed weekly, but more often if it is approaching severely low levels. Daily or even more frequent testing by BPP or NST may be indicated in critical situations.

Doppler Ultrasound Evaluation

Extensive research on Doppler US analysis of uterine, umbilical, and various intrafetal vessels confirms a strong correlation between high-resistance arterial waveform patterns (e.g., low, absent, or reversed diastolic flow in the umbilical artery) and subsequent IUGR, hypoxemic fetal morbidity, and mortality. The correlation is greatest in high-risk pregnancies but insufficiently predictive in general, low-risk populations to be useful as a primary screening test.

Some have argued that since Doppler US appears to be applicable primarily in a population already defined as high risk, the clinical decisions as to

when a fetus is compromised and requires emergent delivery will be based on the BPP and heart-rate monitoring, making the Doppler US assessment superfluous. A meta-analysis of 20 controlled trials of Doppler ultrasonography, however, found "compelling evidence" that knowledge of the Doppler US evaluation findings improved perinatal outcome in high-risk pregnancies, reducing antenatal admissions, inductions of labor, and cesarean sections for fetal distress, and reducing the odds of perinatal death by 38%.

Studies correlating Doppler US evaluation findings with the BPP, amniotic fluid volume, NST, US fetal weight estimates, and maternal blood pressure have shown that predictabilities of IUGR and fetal compromise are, to some extent, additive. Doppler US waveform abnormalities may precede clinical recognition of less-than-expected abdominal enlargement, with abnormal BPP an even later finding. One review summarizes many of these concepts about the sonographic assessment of IUGR. Another research group found that decreased amniotic fluid and abnormal umbilical cord arterial Doppler US waveforms were independent predictors of poor neonatal outcomes. A retrospective study found that SGA singleton pregnancies with abnormal umbilical artery blood flow patterns had higher cesarean section rates for fetal nonreassuring status, increased neonatal intensive care unit stays, and increased neonatal morbidity. Those SGA fetuses with normal umbilical Doppler US patterns were unassociated with these complications, suggesting that these were constitutionally small babies rather than being growth-restricted. As the degree of fetal compromise progresses, there is a transition from a high-resistance middle cerebral artery (MCA) Doppler US pattern to a low-resistance pattern, so-called cephalization of blood flow to protect the brain.

In addition to arterial Doppler US evaluation, the fetal venous system can also be interrogated as a surrogate for forward cardiac blood flow or preserved cardiac output. In a recent study of fetuses with early-onset placental dysfunction, research demonstrated that ductus venous Doppler US parameters emerge as the primary cardiovascular factor in predicting neonatal outcome.

Fetal Movement Counting

An additional test of value in IUGR and other high-risk pregnancies is daily (or even more frequent) fetal movement counting by the mother. Frequent and vigorous fetal movements are evidence of well-being, providing reassurance to the mother, while diminishing fetal activity can provide an early warning of a deteriorating fetal status. The testing is easy and inexpensive but provides benefit in addition to the formal fetal surveillance protocols.

The specific variant conditions included in this Appropriateness Criteria® topic require several additional comments.

A fetus small for dates compared with an earlier US study in which amniotic fluid volume was low or low normal is the typical setting in which uteroplacental insufficiency is the most likely mechanism for IUGR. Repeat US for biometry is indicated, with the frequency adjusted by the severity of the growth restriction and the gestational age. Mild growth lag prior to 28 to 30 weeks can be remeasured in 4 weeks, while severe IUGR after 33 weeks may be best remeasured in 2 weeks. Some formal testing protocol for fetal well-being should be initiated on a weekly or twice-weekly schedule. Daily fetal movement counts are indicated.

IUGR caused by uteroplacental insufficiency is unusual when a normal amniotic fluid volume is present with a small or very small fetus. A first consideration should be the possibility of inaccurate dating of the pregnancy. This can be confirmed by follow-up US biometry that demonstrates appropriate interval growth of the fetal measurement parameters for the number of weeks intervening between the first and second examination. With a symmetrically very small fetus for dates, however, particularly if detected in the second or even first trimester, the possibility of aneuploidy, especially trisomy 18, trisomy 13, and triploidy, must be considered. Needless to say, the presence of fetal anomalies will raise the concern for chromosomal abnormality considerably. Diagnosis is generally accomplished by amniocentesis, but if a rapid karyotype is needed (e.g., to avoid a cesarean section because of compromise of a fetus with a lethal condition), cordocentesis or placental biopsy can often provide an answer in 48 to 72 hours. FISH (fluorescent in situ hybridization) from amniocentesis is first line with cordocentesis and placental biopsy as other options.

When there is low or absent amniotic fluid with a normally grown fetus, causes of oligohydramnios other than IUGR must be considered. These include obstruction or nonfunction of the fetal urinary tract, premature rupture of membranes, and tocolysis of preterm labor by nonsteroidal anti-inflammatory agents. Regardless of its etiology, oligohydramnios is an important risk factor for perinatal morbidity and mortality, due largely to umbilical cord compression but also, in cases of early and long-standing oligohydramnios, to the possible occurrence of pulmonary hypoplasia. Close monitoring of fetal condition is indicated along with periodic imaging evaluation of the fetus to check growth and chest configuration for degree of lung compression.

Summary

- IUGR, with its inherent risks of fetal morbidity and mortality from the hypoxemia of inadequate uteroplacental function, must be considered a major abnormality of pregnancy.
- When it is suspected on the basis of clinical and sonographic findings, urgent management decisions may be necessary, including the possibility of emergent preterm delivery.
- A protocol of frequent fetal surveillance is indicated to guide patient management and the timing of delivery.

Safety Considerations in Pregnant Patients

Imaging of the pregnant patient can be challenging, particularly with respect to minimizing radiation exposure and risk. For further information and guidance, see the following ACR documents:

- ACR Practice Guideline for Imaging Pregnant or Potentially Pregnant Adolescents and Women with Ionizing Radiation
- ACR-ACOG-AIUM Practice Guideline for the Performance of Obstetrical Ultrasound
- ACR Manual on Contrast Media
- ACR Guidance Document for Safe MR Practices

Abbreviations

- BPP, biophysical profile
- IUGR, intrauterine growth restriction
- US, ultrasound

Relative Radiation Level Designations

Relative Radiation Level*	Adult Effective Dose Estimate Range	Pediatric Effective Dose Estimate Range
O	0 mSv	0 mSv
	<0.1 mSv	<0.03 mSv
	0.1-1 mSv	0.03-0.3 mSv
	1-10 mSv	0.3-3 mSv
	10-30 mSv	3-10 mSv
	30-100 mSv	10-30 mSv
*RRL assignments for some of the examinations cannot be made, because the actual patient doses in these procedures vary as a function of a number of factors (e.g., region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as "Varies."		

Clinical Algorithm(s)

An algorithm for growth disturbances/growth restriction is provided in Appendix 2 of the original guideline document.

Scope

Disease/Condition(s)

Intrauterine growth restriction (IUGR)

Guideline Category

Diagnosis

Evaluation

Risk Assessment

Clinical Specialty

Medical Genetics

Obstetrics and Gynecology

Radiology

Intended Users

Health Plans

Hospitals

Managed Care Organizations

Physicians

Utilization Management

Guideline Objective(s)

To evaluate the appropriateness of radiologic procedures for pregnant women at risk of intrauterine growth restriction (IUGR)

Target Population

Pregnant women with a risk of intrauterine growth restriction (IUGR)

Interventions and Practices Considered

Ultrasound (US) of the pregnant uterus

- With biophysical profile
- With Doppler

Major Outcomes Considered

Utility of radiologic examinations in differential diagnosis

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Literature Search Procedure

The Medline literature search is based on keywords provided by the topic author. The two general classes of keywords are those related to the condition (e.g., ankle pain, fever) and those that describe the diagnostic or therapeutic intervention of interest (e.g., mammography, MRI).

The search terms and parameters are manipulated to produce the most relevant, current evidence to address the American College of Radiology Appropriateness Criteria (ACR AC) topic being reviewed or developed. Combining the clinical conditions and diagnostic modalities or therapeutic procedures narrows the search to be relevant to the topic. Exploding the term "diagnostic imaging" captures relevant results for diagnostic topics.

The following criteria/limits are used in the searches:

1. Articles that have abstracts available and are concerned with humans.
2. Restrict the search to the year prior to the last topic update or in some cases the author of the topic may specify which year range to use in the search. For new topics, the year range is restricted to the last 5 years unless the topic author provides other instructions.
3. May restrict the search to Adults only or Pediatrics only.
4. Articles consisting of only summaries or case reports are often excluded from final results.

The search strategy may be revised to improve the output as needed.

Number of Source Documents

The total number of source documents identified as the result of the literature search is not known.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Strength of Evidence Key

Category 1 - The conclusions of the study are valid and strongly supported by study design, analysis, and results.

Category 2 - The conclusions of the study are likely valid, but study design does not permit certainty.

Category 3 - The conclusions of the study may be valid, but the evidence supporting the conclusions is inconclusive or equivocal.

Category 4 - The conclusions of the study may not be valid because the evidence may not be reliable given the study design or analysis.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

The topic author drafts or revises the narrative text summarizing the evidence found in the literature. American College of Radiology (ACR) staff draft an evidence table based on the analysis of the selected literature. These tables rate the strength of the evidence for all articles included in the narrative text.

The expert panel reviews the narrative text, evidence table, and the supporting literature for each of the topic-variant combinations and assigns an appropriateness rating for each procedure listed in the table. Each individual panel member forms his/her own opinion based on his/her interpretation of the available evidence.

More information about the evidence table development process can be found in the ACR Appropriateness Criteria® Evidence Table Development document (see the "Availability of Companion Documents" field).

Methods Used to Formulate the Recommendations

Expert Consensus (Delphi)

Description of Methods Used to Formulate the Recommendations

Modified Delphi Technique

The appropriateness ratings for each of the procedures included in the Appropriateness Criteria topics are determined using a modified Delphi methodology. A series of surveys are conducted to elicit each panelist's expert interpretation of the evidence, based on the available data, regarding the appropriateness of an imaging or therapeutic procedure for a specific clinical scenario. American College of Radiology (ACR) staff distributes surveys to the panelists along with the evidence table and narrative. Each panelist interprets the available evidence and rates each procedure. The surveys are completed by panelists without consulting other panelists. The ratings are a scale between 1 and 9, which is further divided into three categories: 1, 2, or 3 is defined as "usually not appropriate"; 4, 5, or 6 is defined as "may be appropriate"; and 7, 8, or 9 is defined as "usually appropriate." Each panel member assigns one rating for each procedure per survey round. The surveys are collected and the results are tabulated, de-identified and redistributed after each round. A maximum of three rounds are conducted. The modified Delphi technique enables each panelist to express individual interpretations of the evidence and his or her expert opinion without excessive bias from fellow panelists in a simple, standardized and economical process.

Consensus among the panel members must be achieved to determine the final rating for each procedure. Consensus is defined as eighty percent (80%) agreement within a rating category. The final rating is determined by the median of all the ratings once consensus has been reached. Up to three rating rounds are conducted to achieve consensus.

If consensus is not reached, the panel is convened by conference call. The strengths and weaknesses of each imaging procedure that has not reached consensus are discussed and a final rating is proposed. If the panelists on the call agree, the rating is accepted as the panel's consensus. The document is circulated to all the panelists to make the final determination. If consensus cannot be reached on the call or when the document is circulated, "No consensus" appears in the rating column and the reasons for this decision are added to the comment sections.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The recommendations are based on analysis of the current literature and expert panel consensus.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Selection of appropriate radiologic imaging procedures for evaluation of pregnant women with fetal growth disturbances and risk of intrauterine growth restriction (IUGR)
- Reduction of fetal morbidity and mortality

Potential Harms

- When clinically suspected, intrauterine growth restriction (IUGR) can be confirmed as probably present by sonographic fetal measurements and weight estimation, but both false-negative and false-positive cases can be anticipated.
- Scores of 8 to 10 on the biophysical profile (BPP) are strong indicators of a well-compensated fetus, but there are many false positives when the fetus fails one or two of the acute marker tests.

Refer also to the "Safety Considerations in Pregnant Patients" section of the "Major Recommendations" field.

Relative Radiation Level (RRL)

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to estimate population total radiation risk associated with an imaging procedure. Patients in the pediatric age group are at inherently higher risk from exposure, both because of organ sensitivity and longer life expectancy (relevant to the long latency that appears to accompany radiation exposure). For these reasons, the RRL dose estimate ranges for pediatric examinations are lower as compared to those specified for adults. Additional information regarding radiation dose assessment for imaging examinations can be found in the American College of Radiology (ACR) Appropriateness Criteria® Radiation Dose Assessment Introduction document (see the "Availability of Companion Documents" field).

Qualifying Statements

Qualifying Statements

The American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those examinations generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Staying Healthy

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Zelop CM, Javitt MC, Glanc P, Dubinsky T, Harisinghani MG, Harris RD, Khati NJ, Mitchell DG, Pandharipande PV, Pannu HK, Podrasky AE, Shipp TD, Siegel CL, Simpson L, Wall DJ, Wong-You-Cheong JJ, Expert Panel on Women's Imaging. ACR Appropriateness CriteriaÂ® growth disturbances -- risk of intrauterine growth restriction. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 7 p. [24 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1996 (revised 2012)

Guideline Developer(s)

American College of Radiology - Medical Specialty Society

Source(s) of Funding

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

Guideline Committee

Committee on Appropriateness Criteria, Expert Panel on Women's Imaging

Composition of Group That Authored the Guideline

Panel Members: Carolyn M. Zelop, MD (*Principal Author*); Marcia C. Javitt, MD (*Panel Chair*); Phyllis Glanc, MD (*Panel Vice-chair*); Theodore Dubinsky, MD; Mukesh G. Harisinghani, MD; Robert D. Harris, MD, MPH; Nadia J. Khati, MD; Donald G. Mitchell, MD; Pari V. Pandharipande, MD, MPH; Harpreet K. Pannu, MD; Ann E. Podrasky, MD; Thomas D. Shipp, MD; Cary Lynn Siegel, MD; Lynn Simpson, MD; Darci J. Wall, MD; Jade J. Wong-You-Cheong, MD

Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

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Guideline Availability

Electronic copies: Available from the American College of Radiology (ACR) Web site .

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

Availability of Companion Documents

The following are available:

- ACR Appropriateness Criteria®. Overview. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site .
- ACR Appropriateness Criteria®. Literature search process. Reston (VA): American College of Radiology; 1 p. Electronic copies: Available in PDF from the ACR Web site .
- ACR Appropriateness Criteria®. Evidence table development – diagnostic studies. Reston (VA): American College of Radiology; 2013 Nov. 3 p. Electronic copies: Available in PDF from the ACR Web site .
- ACR Appropriateness Criteria®. Radiation dose assessment introduction. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in PDF from the ACR Web site .
- ACR Appropriateness Criteria®. Procedure information. Reston (VA): American College of Radiology; 1 p. Electronic copies: Available in PDF from the ACR Web site .
- ACR Appropriateness Criteria® growth disturbances—risk of intrauterine growth restriction. Evidence table. Reston (VA): American College of Radiology; 2012. 6 p. Electronic copies: Available in PDF from the ACR Web site .

Patient Resources

None available

NGC Status

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